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THE YUKON AND ITS BASIN

COMPILED FROM THE REPORT OF THE U. S. GEOLOGICAL SURVEY ON THE GEOLOGY AND GEOGRAPHY OF ALASKA

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FOR many centuries the rivers of Alaska were her only gateways. Indian hunters, Siberian fur-gatherers, Russian explorers, American miners and engineers, all made use of the great water-ways.

Knowledge of the interior of Alaska has been gained chiefly within the last twenty years, and is unknown to text-books. Statements concerning it must therefore closely follow government reports, which contain accounts of preliminary surveys of all but three of the large rivers.

The main topographic features of Alaska are similar to those of the western United States. The highlands of Alaska, like those of the United States and Canada, are in general parallel to the coast line, and the investigations of Dr. Dawson and others have shown that the four topographic provinces of the United States are fairly well defined through western Canada and continue into Alaska.

Each of these provinces is of a dominant topographic type. Along the Pacific Coast of Alaska and British Columbia, the western-most province is a mountainous belt from 50 to 200 miles wide. The ranges of this Pacific mountain system are distinct, often separated by broad valleys or indentations of the coast line, forming in some cases large basins like that of the Copper River. A section of the inner slope drains into the Yukon and Kuskokwim. Otherwise its waters reach the Pacific through streams running transverse to the axis of the mountains.

East and north of the Pacific mountain system is the Central Plateau region. This is not strictly a plateau. For the most part this region is a gently rolling upland, in which the rivers have trenched broad channels. The interstream areas are the remnants of a former plateau surface, dis-

sected by erosion, whose rolling surface slopes gently to north and west. A number of mountains and mountain groups rise above the general level.

This belt is drained largely by the Yukon and Kuskokwim into Bering Sea. It includes a number of lowland areas of considerable extent. Among these are the flats of the middle Yukon and upper Kuskokwim and the lowlands which extend along Bering Sea adjacent to the deltas of these rivers.

East and north of the plateau is a broad cordillera, the northern extension of the Rocky Mountain system. The southern slopes drain chiefly into the Yukon; the northern into the Arctic Ocean.

The Great Plain east and north of the Rockies forms the fourth province. This region is dissected, more or less rolling, and its waters reach the Arctic.

The southern and higher range of the Rocky Mountain system of Alaska forms the watershed between the Yukon and the Arctic waters. In Alaska the drainage belongs to three divisions; its southern part, about one-fifth of its area, drains into the Pacific Ocean; the great interior region, covering nearly one-half of Alaska, drains into Bering Sea; and the rest of its territory, its northern part, drains into the Arctic Ocean.

The Yukon, flowing into Bering Sea, is the master stream. This mighty river, the fifth in size in North America, springs from head-waters in British Columbia, far to the southeast of Alaska, where it fights for supremacy on the one hand with water-courses flowing into the Pacific, and on the other with those belonging to the Arctic watershed. The Yukon flows northwest as far as the Arctic Circle, then sweeps around to the southwest, and finally pours its great volume of muddy waters into Bering Sea, over 2,000 miles from the source of its longest tributary.

The basin of the Yukon is outlined in a general way by the boundaries of the Central Plateau province, of which its valley occupies nearly the medial line, and makes with it the same great bend to the southwest, parallel to a similar swing of the two mountain systems on the south and north.

Near the northern boundary of British Columbia the plateau has an altitude of about 5,000 feet at its western margin, slopes downward toward the center, and probably rises again toward the Rocky Mountain front. It also declines northward to an altitude of about 4,000 feet, near the intersection of the 63rd parallel with the Yukon.

The plateau extends northward as far as the great bend of the Yukon, then encircling the broad lowland known as the Yukon Flats, it falls off still more to the southwest until it has an altitude of less than 2,000 feet near the Lower Ramparts.

At the great bend of the middle Yukon is the depressed area known as the Yukon Flats. Roughly speaking, this lowland is a rectangle about 200 miles long and from 40 to 100 miles wide, nearly bisected by the Artic Circle. It has an altitude of about 500 feet, and as the name implies, is a monotonous lowland.

Within these flats the river changes its course from northwest to southwest.

No surveys have been made of this part of the river, but in places the stream broadens to 10 and possibly 20 miles, and includes an intricate system of water-ways, with some channels having a preceptible if not strong current; while others are sloughs, with almost stagnant water. The shifting water-ways form many oxbow lakes. These channels are separated by sand-bars and islands, for here, where the river is ever changing, new courses are constantly being cut, and old ones abandoned and filled up by the silts of the heavily burdened waters.

This action of the river makes navigation an ever-changing problem to the steamboat pilots, who, on account of the absence of charts, are entirely dependent on knowledge acquired by experience. During the rush to the Klondike, Indian pilots steered most of the steamers, but these have now been largely replaced by white men trained on the Mississippi under similar conditions.

From the steamer deck the Yukon Flats present a monotonous expanse of sand-bars and low, densely-forested spruce islands, through which the boat follows a tortuous channel among a bewildering maze of tributary and distributary water-courses, with an occasional glimpse of the distant rim of the plateau which surrounds the lowland.

The presence of man in this dreary tract is seen only in the clearings from which the spruce has been cut for fuel, or in an occasional Indian settlement, or in the huts of the wood-choppers.

At low water 10 or 15 feet of frozen silt bank is exposed, while during floods the river is almost even with the surface of the islands.

Near the 66th parallel of latitude the flats end abruptly at a scarp which forms the northern boundary of a part of the plateau. This stands between 1,800 and 2,000 feet above sea level, and is often called the Lower Ramparts of the Yukon.

The Yukon traverses this upland by a narrow, somewhat winding valley, whose walls often rise, rampart like, either directly from the water or from a narrow terrace. The stretch of the valley, between 110 and 130 miles long (measuring around the bends), and from one-half mile to three miles wide, continues unbroken from the Yukon Flats to the mouth of the

Tanana. The general course is southwesterly, but it has many windings, which strongly suggest incised meanders, the relics of a former flood-plain condition.

The Rampart region with the broad sweeping curves of the river and the steep valley walls, clothed with spruce, cottonwood, and birch, varied by bare cliffs, is the most picturesque part of the Yukon.

The Russian Lieutenant Zagoskin, in 1848, reported the Yukon as unnavigable above the lower end of the Ramparts, though its ascent and descent by steamer is attended by much less difficulty than in any other part of the river, for the current probably does not exceed 5 or 6 miles per hour, and there are few shifting sand-bars to contend with. In this region a few streams are confluent from both north and south, but none is large enough to be called a river, though one, Ray River, passes as such. All of these water-courses flow in normal valleys, broad, gravel-filled near their mouths, narrowing up-stream to sharply trenched, rock-floored canyons toward their head-waters.

Under the name of Lower Yukon is included the portion of the river which is between the Ramparts and the sea, and which, measured along the bends, has a length of about 800 miles.

The Ramparts end at the mouth of the Tanana, where there is an abrupt change in the contour of the valley. The gorge suddenly opens to a broad lowland, which along the Yukon is 15 to 20 miles in width. To the head of the delta the width of the valley varies, while the river itself flows through many channels and is broken by numerous islands and sand-bars.

The delta begins near the 63rd parallel of latitude, where the river divides into a number of divergent channels which find their way to the sea, with general northerly and northwesterly courses. The most northern and southern of these water-ways reach the open sea at points about 75 miles apart in an air line, and 40 or 50 miles from the head of the delta. A maze of water-ways lies between the two channels, some of which flow chiefly into Bering Sea. Others connect with such channels, but many are blind sloughs, affected only by the ebb and flow of the tide. The inter-stream areas, not more than 10 feet above low tide, are swampy, and dotted with innumerable small lakes.

Here, as in the flats, the Yukon is constantly shifting its channels. The changes are brought about largely by the current and tides, but are aided by the scouring of the ice, which accumulates in the delta after the break-up in the spring, and which forms dams that cause new channels to be cut and old ones to be silted up.

Throughout its course the Yukon is a mud-laden stream, but it is more heavily charged with sediment above the flats than below, for during its comparatively sluggish course throughout this lowland belt, it drops part of its load.

The silt-laden waters of the lower river are making rapid inroads on the sea by extending the delta. In the winter the waters are said to be perfectly clear.

Though the Yukon delta properly includes only that part of the coastal plain between the distributaries of the river, the broad lowland which embraces the deltas of the Yukon and Kuskokwim has an extreme breadth of upward of 200 miles, and might well be grouped with the delta flats. There can be no doubt that at some time a part of the Yukon waters found its way across these lowlands, and deposited the sediments by which they were made to encroach upon the sea. At low tide this low coastal plain is extended a long distance seaward by mud-flats.

The lower Yukon offers no serious menace to navigation by river-steamers, but like the upper river it is uncharted, and except in the delta mouth its channels are unbuoyed. The current is estimated at from 1½ to 4 miles per hour, and the influence of the tide reaches to the head of the delta.

In the delta, steamers usually follow the northernmost waterway called Apoon Pass, for this has a well-defined though shifting channel, through which 4 feet can be carried at mean low water. At the mouth of the pass the water shoals to 1½ feet at low water, and steamers are forced to take advantage of high tide to cross the bar.

From the Apoon mouth the river steamers make their way across a stretch of about 60 miles of open sea to St. Michael Island, which possesses the only harbor, and that a poor one, along many hundred miles of the coast, and here the transfer to ocean steamers is made. The passage from the mouth of the river to St. Michael in the flat-bottomed river steamers can be made in safety during calm weather, but at other times is not without danger.

The scenery of the lower Yukon offers but little of interest to the traveler. The mighty river, with its dark yellow waters, is not without its grandeur, and the rounded slopes of the valley, dotted with spruce and deciduous trees, are not without picturesqueness, but for hundreds of miles there is almost no change in the aspect of the landscape. The upper reaches of the lower Yukon are heavily forested, but as the sea is approached, the trees become more scattering, and finally, a few miles above the delta, give way entirely to the tundra, with its dreary, monotonous view.

ARID MONADNOCKS

By CHARLES R. KEYES
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IN countries of normal moist climate prominent residual mountains of the Mt. Monadnock type are relatively rare. In arid lands this class of mountains appears not to have received any particular notice. A few examples are incidentally mentioned from the Great Basin region of western America;[1] and they are also recorded from the dry tableland of South Africa.[2] That residual mountains are really of frequent occurrence in our western arid region is a late suggestion.[3] That they are, in all desert regions of the globe, probably the prevailing class is a statement that, through critical observation, is only beginning to find satisfactory and adequate substantiation.

The desert ranges of western America have been studied chiefly in the Great Basin, which is only a minor part of the vast arid region. Until lately they have been considered as formed mainly through direct uplift, the long, tilted fault-blocks being comparatively little modified by erosion. As has been well stated by Professor Davis,[4] this primitive theory of mountain building finds little support, particularly in such groups as the Alps, "where existing forms of peak and pass, spur and valley are the product of extensive erosion in a deformed and broadly uplifted mass." In the production of the present facial expression of the Great Basin region more recent opinion gives greater prominence to erosion than to tectonics. The tilted blocks, since their alleged recent uplift, are regarded as having suffered more or less extensively from water-action, especially at no distant geologic date when there was supposed to be much greater precipitation than now.

Regarding the origin of the desert ranges the latest observations of a critical nature go to show that, in general, these mountains must be considered as the ultimate products of the action of several sorts of geologic forces, operating sometimes severally, sometimes in conjunction, at diverse times and with different degrees of intensity. It is the relative ascendency of the several geologic processes that is of special interest at the present time.

While in some of its general effects erosion by water is not very unlike that by wind under conditions of aridity, the utter impotency of the former

[1] *Bull. Mus. Comp. Zool.*, Vol. XLII, p. 142, 1903.

[2] *Zeitsch. d. deuts. geol. Gesellsch.*, LVI Bd., Protokol, p. 193, 1904.

[3] *Journal of Geology*, XVI, 1908.

[4] *Bull. Mus. Comp. Zool.*, Vol. XLII, p. 130, 1903.

in an arid country where the annual rainfall is less than 10 inches, most of which sinks into a spongy soil as soon as it touches it, is at once apparent. The only other alternative is a span of time long beyond all reason.

The efficiency of wind-scour both as a denuding agent and as a medium of rock-waste transportation has been demonstrated recently by many observations. Passarge[1] and Bornhardt[2] have shown in South Africa that the action of the wind may account for all of the plains-forming features of that region. Penck[3] has even gone farther and suggested that the general leveling and lowering of a desert area may go on indefinitely even below sea level, provided the ocean is kept out, because there is no base level of erosion in a dry climate. Still more recently it has been pointed out[4] that the planation of our western intermont plains of Nevada, Arizona, and New Mexico is largely accomplished by the winds. It would seem, therefore, that under conditions of an arid climate general erosion effects must be regarded mainly as the results of wind-scour rather than those of normal water-action as in moist lands.

In considering the broader effects of wind-sculpturing, the character of the surface relief of the desert region at the beginning of the present cycle is important. Of this we seem to be able to judge something, at least so far as the southern part of the great arid tract in the United States is concerned. In the high-lying plain of the Mesa de Maya, in northeastern New Mexico, there appears to be the remnant of an old peneplain.[5] The extension of this lava-capped mesa is the flat summit of the Raton range, which extends 100 miles eastward from the Rocky Cordillera. It now lies 3500 feet above the next great plain below and 4000 feet above the present general plains-level of this part of the country. Out of the substructure of this old plain seems to have been carved, mainly by the winds under conditions of arid climate, most of the present mountains and other eminences now raised above the general plains-surface. The mountains of the desert are thus regarded chiefly as residual spots that have not been worn down as fast as the surrounding plains-areas.

Differential relief effects of eolian erosion are, as in the case of water erosion, dependent largely upon the local resistance capacities of the rocks. The areal distribution of the resistant rock-masses and of the weak rocks, as general planation and lowering of the surface go on, is controlled principally by the geologic structures acquired prior to the commencement of

[1] *Zeitsch. d. deutschen geol. Gesellsch.*, LVI Bd., Protokol, p. 193, 1904.
[2] *Zur Oberflach. u. Geol. Deutsch-Ostafrikas*, Berlin, 1900.
[3] *Am. Jour. Sci.*, (4), Vol. XIX, p. 165, 1905.
[4] *Bull. Geol. Soc. America*, Vol. XX, 1908.
[5] *Proc. Iowa Acad. Sci.*, Vol. XV, 1908.

the latest erosion cycle. The tectonic features brought out in the general wasting away of the country are not alone those resulting from simple dislocation. Profound faulting and marked tilting of the fault-blocks whereby hard rock-masses are brought into juxtaposition with soft ones, as is commonly ascribed to most of the Basin ranges, is only one method out of several by which are induced the requisite conditions for monadnock formation in arid lands.

Gentle folding of alternating hard and soft terranes has given rise to especially advantageous conditions for the unequal attacks of wind-scour in general desert-leveling, and for the existence of remnantal eminences on the plains-surface. Of this type the Las Vegas mountains and the Charleston range in southern Nevada appear to be good examples.

Laccolithic swellings, such as are displayed in the Ortiz, Tuertos, San Ysidro, and Cerrillos groups in New Mexico, and in the Henry mountains in southern Utah, have in the general process of desert-leveling permitted the resistant intrusive masses to remain as immense mounds rising island-like out of the surrounding sea of plain, the substructure of which is composed of weak sandstones and shales.

Volcanic necks of old Tertiary eruptions, every vestige of whose surface outpourings has been long since removed in the general planation of the Mesa de Maya time, often give rise to noble mounds which protrude a few hundreds or a few thousands of feet above the present plains-surface. In northwestern New Mexico, as described by Dutton, dozens of buttes of this class are frequently in sight at once. The grandest of these is Mount Cabazon. There occur in northeastern New Mexico similar fields of volcanic necks, the soft Cretacic shales which they penetrate having been removed from around them down to the level of the general plain.

Still another type associated with old volcanic activity is represented by thick local accumulations of lava. While the field of soft clastics around was being lowered through the general plains-leveling process, the more resistant eruptives were in the same time only somewhat subdued in their outlines so that they now appear as huge rounded bosses, exemplified by such mountains as the Sierra Blanca.

Lava-flows frequently constitute areas that resist for a long time the general lowering of the country through erosion. In time they become plateau-plains of greater or less extent. The great Mesa de Maya is perhaps the most notable instance. In their last stages of breaking down these plateau-plains pass into isolated mounds which long continue to remain high above the level of the surrounding country. Eagle-tail Mountain, Wagon Mound, and many other neighboring hills rising out of the Las

Vegas plain south of Raton illustrate different stages of remnantal mountains of this class. In a similar manner a thick indurated layer of a stratified sequence may form a protecting cap and allow a limited area to remain long above the continually lowering plain.

Owing to peculiarities in general desert-leveling and the general lowering of a dry country the dominant relief feature is the plain. Notwithstanding the fact that it may be abundantly studded with mountains the plain persists from the very beginning of the arid cycle. Most of the mountains and hills rising above the plains-surface very early become true monadnocks. Under conditions of a moist climate a recognizable general plains-surface usually only commences to make its appearance in the last stages of the geographic cycle. In a wet country the monadnock is an exceptional feature; in an arid land it is a prevailing characteristic.

The present configuration of the desert ranges is, therefore, probably dependent much more upon the direct effects of erosion—eolian erosion—than it is upon local upheaval, though faulting and flexing have been no doubt never entirely quiescent for any great length of time. The apparent marked dissection of the higher desert mountains by running water is clearly not so important as has been commonly supposed. The total volume of rock-waste brought down from a desert range in the course of a year may be carried away by the wind in a single day.

PINE FORESTS NOW GROWN ON FORMER SAND DUNES AND MARSHES IN FRANCE.—Prior to 1803, the 2,500,000 acres comprised in the Department of the Landes were little more than shifting sand dunes and disease-breeding marshes. This section is now one of the richest, most productive, and healthful in France. This marvelous change has been brought about by the intelligent cultivation of pine forests. Immense forests now cover the country, the sand dunes and marshes have long since disappeared, and the wood, charcoal, turpentine, rosin, and kindred industries have brought wonderful prosperity to the entire department, which was formerly the most barren and miasmatic in France. The climate is now mild and balmy, the great change being wrought by the forests. The thin layer of clay beneath the sandy surface, formerly impervious to water, has been so pierced by the roots of the pine that there is now thorough drainage to the spongy earth below.—*Report of Consul D. I. Murphy in Monthly Consular Reports,* March, 1908.

THE FOUNDING OF TENNESSEE

By SADIE ADELAIDE FRANK
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GENERATIONS ago the broad lands of which Tennessee is a part, were truly a debatable area. This beautiful wilderness, the paradise alike of hunter and trapper, had been claimed by the five nations of the North and the Cherokees of the South; and long before the interloping paleface had crossed the Appalachian Mountains, it had been devoted by common consent to the hunting grounds of all and the residence of none.

Later De Soto, a Spaniard, explored Florida and crossed the Mississippi into Tennessee. The Pope had made a decree granting to Spain all lands west of a certain point in the Pacific. La Salle and Marquette explored the Mississippi and named the Shauvanon River, which later was called the Tennessee. France claimed Tennessee as a part of New France. Sir John Smith, Spottswood, and others crossed the Blue Ridge from Jamestown. This made England claim Tennessee as a part of Virginia. Yet neither nation did much to settle this land. It was too far inland and the Indians were too fierce.

As early as 1748, a few traders and hunters, notably Cols. Wood, Patton, and Buchanan were daring enough to explore Powell's Valley, to cross the range of mountains into the deep valley, thence to embark on the beautiful waters. 'Twas then they gave the names to Cumberland Mountains, Cumberland Gap, and Cumberland River, all in honor of the Duke of Cumberland, then Prime Minister of England. From this time on there straggled in settlers from Virginia, North Carolina, and South Carolina, without knowing they had crossed the boundary line. In 1769 or 1770, William Been came as far south as the Watauga settlement and erected a log cabin at the mouth of Boone's Creek. Here his son Russell, the first white child born on Tennessee soil, was afterwards born. Daniel Boone, the father of Kentucky, made a treaty with Occonostata, the Indian chief, whereby he gained lovely though dark and bloody ground.

Tennessee history centers around James Robertson, a native of North Carolina. King George III tyrannized over the settlers to such a degree that they were driven to move westward into a new and therefore a free land. One day Daniel Boone passed through the Carolina settlement and gave such glowing accounts of the beautiful land and fertile wilderness that Robertson set out with him at once to go on ahead and prepare the way for his own family and friends. A picturesque sight indeed were the two brave men, astride their trusty horses, with their dark hunting shirts fringed around the bottom. They were belted at the waist with stout leathern

belts from which hung their long, sharp knives. Trophies of dead coons hung from their caps and fringed leggings almost hid their moccasins. Each had a rifle, salt and corn. The woods and streams about them were expected to furnish food. In the Spring of 1770, while the wild deer and buffalo fled before the two riders, the wild call of the turkey answered the notes of the whip-poor-will. A slight blush of dawn in the east aroused the chattering noise of all the dwellers of the tree-tops. Robertson looked down from the heights of the Unakas into the promised land. Crossing to the Watauga Valley, he was hospitably welcomed by Been and Honeycutt. He found buffalo, deer, elk, bears, wild turkeys, wolves, and foxes in abundance. A field of corn, planted to test the fertility of the land, grew like Jack's bean stalk. Enthused with the newly opened country, and imbued with the ideas of liberty, Robertson took leave of his kind friends and started home. He had no compass, but managed successfully until he got to the Cumberland Mountains. Here it rained for a week; the sun was hidden by day, the light of the stars was extinguished by night. For seven days Robertson wandered on the mountains, often retracing his very steps; no food,—powder wet and useless. Finally he became unconscious. At this critical point, some settlers chanced to find his almost lifeless body and took compassion on him and restored him. He went on to North Carolina, fully believing that God had spared his life for the purpose of making him a leader for freedom and liberty. So it came about that in the spring of 1771, sixteen families, consisting of 80 men, women, and children, crossed the Unakas and founded the free state of Tennessee. Their first homes were among the Watauga settlers.

For two years all went well. Then the Watauga settlers were ordered off by the Indians, because the land had been surveyed by one Anthony Bledsoe and found to be outside of Virginia territory. A treaty was made, however, by which they leased lands from the Indians and drew up a written constitution to govern themselves. In 1775, when the conflict between Great Britain and the Colonies commenced, Watauga joined her sister Nollichucky and the union was called the Washington District. This was the first geographical district in the United States named for the Father of our Country. In 1776, North Carolina admitted to her Legislature Chas. Roberson, John Carter, John Hall, and John Sevier as delegates from Washington District. This meant the formal recognition that Washington District was a part of North Carolina so they changed the name to Washington County. As a part of North Carolina, the Indians were kept from attacking the settlers.

So in 1780, James Robertson in charge of a party overland, and Capt.

John Donelson, in charge of the canoes on the Tennessee River, met and formed a settlement at French Lick Springs now in North Nashville, and called it the Cumberland Settlement. Other immigrants followed of whom Ramsey says, "The facility of taking up the choice lands of the country induced great numbers of persons, principally those without means, to emigrate to the frontier. A poor man with seldom more than a single pack horse on which the wife and infant were carried, with a few clothes and bed quilts, a skillet and a small sack of meal, was often seen wending his way along the narrow mountain trace, with a rifle upon his shoulder, the elder sons carrying an axe, a hoe, sometimes an augur and a saw, the elder daughters leading or carrying the smaller children. They brought no wealth with them, but what was far better, they had hardihood and enterprise, and fearlessness and self-reliance." Now Watauga played a conspicuous part in the Revolutionary War. Many battles, chiefly King's Mountain, testified to their valor and endurance.

This war brought out all their Anglo-Saxon traits, chief of which was the desire for self-government. Consequently when North Carolina in the Cession Act of 1784 ceded to the United States that portion of North Carolina now called Tennessee, the people arose in righteous indignation at being deprived of statehood. Many meetings and much discussion followed. The result was a constitution for the state of "Frank Land"—Land of the Free. Later, North Carolina's constitution was adopted and the name changed to Franklin. The people began to long for their own statehood. In 1789 they began to see that the most speedy means of acquiring this statehood was by the very cession they had before resented.

Accordingly North Carolina again ceded this land to the United States under the Southwest Territory. Many new counties were organized and the territory was divided into two judicial districts, the eastern called the Judicial District of Washington and the western called the Judicial District of Mero. The people now saw that their very lives depended on their acquiring statehood. This became a party question. It finally resulted in this way: the House held that the Territory having attained a population of 60,000 free inhabitants and adopted a Republican form of government, was entitled to all the rights and privileges of statehood. It took the Senate many months of discussion and argument before it agreed and the bill was finally passed to President Washington, who approved it on the first day of July, 1796.

Tennessee had become a member of the Union—the first member erected out of a territory of the United States.

EDITORIAL

Secondary School Geography Again

In the spring of this year, two numbers of the Journal were largely devoted to a symposium on the question of secondary school geography. The contributions were from superintendents, secondary school teachers of geography, normal school and college professors, and authors of several of the leading textbooks of geography. Although the several writers were not agreed as to many details, there was a general unanimity of opinion as to the necessity of a change in the character of the geography to be taught in secondary schools.

Further correspondence, and numerous conversations with leaders in secondary school work, have shown that many consider this problem the most vital one in geography teaching to-day. The Journal will be glad to receive the opinions of all interested as to what secondary school geography should be and the Editor will be glad to devote much space to this topic during the present school year.

A Bibliography on Geography Teaching

The Journal is glad to announce that a carefully selected and annotated bibliography on geography teaching will appear early in 1909. The Council of the American Federation of Teachers of the Mathematical and the Natural Sciences, appointed in April of this year a committee to prepare a small and workable Bibliography on Science Teaching, to include biology, nature-study, physics, chemistry, geology and geography, and mathematics. Each sub-division was given to an expert in the special field. Mr. R. H. Whitbeck of the Trenton (N. J.) State Model School is preparing the Bibliography on Geography and Geology. The complete work will be published by the Federation and should appear not later than March 1, 1909.

Rural School Geography

In no type of environment should it be as easy to teach geography well as in country districts. Here the ordinary topics of landscape and weather can be readily illustrated and studied from nature; here also the relations of man to his physical and social surroundings can be most clearly seen and the economic side of geography is most obvious. Yet, except for scattered and incomplete suggestions in books on agriculture, on nature-study, or on rural school curricula, no attention practically has been given to this phase of the work. Here is a field of labor large enough for any geographer and in which the help of the trained geographer and teacher is sorely needed.

NEWS ITEMS

Mr. G. T. Surface of the Central High School, Philadelphia, Pa., has been appointed Instructor in Geography at the Sheffield Scientific School, Yale University, New Haven, Conn.

Superintendent W. N. Clifford of Council Bluffs, Iowa, widely known for his success in introducing commercial geography into the course of study of his city, has recently taken charge of the commercial geography in the Southern High School for Boys in Philadelphia, Pa.

GEOGRAPHY AT YALE UNIVERSITY.—President A. T. Hadley of Yale University announced in his last annual report the intention of the authorities to develop the geography work at Yale until the staff shall contain a special teacher for each continent, so that courses can be given in the regional geography of the world as well as in the special branches of general geography.

THE CLEVELAND GEOGRAPHICAL SOCIETY.—The Journal announces with pleasure the recent formation of a Geographical Society in Cleveland, Ohio, with an initial membership of over two hundred and sixty. This society is due largely to the energy and enthusiasm of Mr. W. M. Gregory of the Central High School. Miss Bertha A. Brown of 7409 Linwood Avenue, Cleveland, is Secretary of the Society.

AN EXHIBIT OF GEOGRAPHICAL MATERIALS FOR TEACHERS.—The American Geographical Society of New York City, will soon open an exhibit of recent materials available for teachers of geography. Detailed announcement will be made later.

NOTES

THE EFFECT OF CLIMATE ON EARLY SETTLEMENT IN THE UNITED STATES.—The settlement and colonization of what is now the United States did not commence until nearly a century had elapsed after the first voyage of Columbus. The Spaniards had been the first to find the New World, and not mere chance had brought them to the tropical and semi-tropical parts of that world. To these, during the century that had passed, their attention had been confined, while the vast rich areas farther north remained almost unknown, so that these regions were left to the French, the English, and the Dutch—people more capable of developing themselves and the country than those who had come from the warm and sunny land of Spain.

The Spaniards' Position.—The Spaniards remained south of the thirtieth parallel of north latitude for several reasons. Columbus had followed, and had shown to those who followed him the easy route westward in the belt of the trade winds, which brought them directly to the tropical regions of the New World. The return route from this American mediterranean was almost as favorable, for sailing slightly north of the westward course Spanish vessels could be carried eastward in the southernmost part of the belt of prevailing westerlies and reach their home ports by a short cruise southward along the coast of Portugal. Again, Spain, as the first to come to the New World and the first to attempt colonization here, naturally chose for her colonies those regions which were most pleasing. Coming from a semitropical land where they had not needed to overcome the rigors of a severe climate, these people selected for settlement lands where the climate was even more genial and the soil more productive than in those they had left; here, except for the hostility of the savages, life would be fairly free from care and toil, and thus well suited to the Spanish nature.

Finally, the tropical regions of America remained in Spanish hands because the other nations had been excluded from these parts to some extent by a papal bull, "and even more effectively . . . by the currents of the air and sea" which, sweeping northward along the coast, confined the English and French to the more northern shores after they had once gained a foothold there.

THE FRENCH IN CANADA.—The St. Lawrence River proved to be the gate of entrance to America for the French. In an important way the history of these people in America is largely the result of climatic factors. In her admirable book on the geographic conditions of American history, Miss Semple says of the land to which the French came: "The glaciated

soil of eastern Canada could promise no great fertility, its bleak climate no luxuriant vegetation; but there was money in peltries." And she further points out the fact that the furs, which the Canadian climate made possible, formed the all-important product which could furnish the large profits necessary for the survival of an infant colony. This very factory not only greatly helped the French colonies in America, but also determined in large measure the nature of these colonies. The soil barred agricultural communities, geographical conditions prevented the development of manufacturing cities such as sprang up in New England. Their trade led the trapper and the hunter far to the west and the south, and they founded small scattered settlements over wide tracts of the country, thus hastening the exploitation of the great interior of North America.

In these facts lies much of France's failure to develop her American possessions. It has frequently been said that "in unity there is strength." The weakness of Canada lay partly in this lack of unity of sentiment, purpose, and settlement; a sparsely populated country, with its few inhabitants widely scattered and ever on the move, is not one likely to possess the elements of strength. Furthermore, a country to be self-supporting, must be able to produce its own agricultural necessities, and this, it has been pointed out, Canada was unable to do. Hence, the colonists had to depend on the mother country, and it was often difficult to maintain the close connection which would be necessary if the growth of the colony were to be healthy and progressive. Mr. Thwaites has expressed this difficulty, with special reference to the centering of the colony at Quebec, in these words: "The entrance to the Gulf of St. Lawrence is so far northward that storms and ice floes endanger navigation during half of the year. Colonial possessions over seas can not be maintained unless the mother country possesses the means of easy and frequent communication with them."

Virginia.—The first permanent English settlement in America was made at Jamestown in 1607. The causes which led to the settlement of Virginia were numerous, but among them climatic influences were not lacking.

Eggleston has pointed out the fact that "the only maxim of political economy accepted in that day was that a nation was enriched by getting money from abroad and keeping it at home." Following this maxim, it was to the advantage of Great Britain to own possessions which could furnish her with those products for which she had been sending to Mediterranean and Scandinavian ports. Such products could not be raised in the British Isles, and from the first, it has been claimed, there was the hope that the climate of Virginia was sufficiently mild to allow the production of those things which the English had had to import from the Mediterranean Basin.

Moreover, there were forests in Virginia which rivalled those of Scandinavia, and if lumber, in addition to the more tropical products, could be obtained, Great Britain could maintain herself independently of the rest of Europe.

However this hope may have stimulated the early settlement of Virginia, it was never fully realized, for the climatic conditions were not all that had been hoped. We are told that "there were some English people, who after they had understood the calmness of the Climate, and goodness of the Soyle, did upon the instigation of some Gentlemen of England, voluntarily offer themselves, even with their wives and children, to go into those parts to inhabite." But the climate was not so mild, perhaps, as these people had been led to believe, for in "An Account of Virginia" written in 1618, we find the following description of the climate and its effects upon the early settlers:

"The sommer here is hot as in Spaine, the winter cold as in Fraunce or England; the heate of the sommer is in June, July, and August, but commonly the cool breezes asswage the vehemencey of the heat; the chief of winter is half December, January, February, and half March.

"The temperature of this country doth well agree with the English constitucions, being sometimes seasoned in the same, which hath appeared unto us by this, that, albeyt, by many occasions, ill lodging at the first . . . hard fare, and their owne judgements and safeties instructing them to worke hard in the fainte tyme of sommer, (the better to be accommodated and fitted for the wynter,) they have fallen sick, yet have they recovered agayne."

The early settlers in Virginia were mainly those whose training had been towards a life generally free from manual labor, for a large part of the population of that colony during the first half century of its history were "gentlemen." As climatic conditions had attracted the easy-going Spaniard to the tropical parts of the New World, so, doubtless, the same influence had induced the English gentlemen to settle in the genial land of Virginia. Once settled here, where the soil and the climate alike combined to favor considerable agricultural holdings, the settlers were scattered on large estates, and the "landed aristocracy" retained the characteristic temperament of the English gentleman. Hence, when colonial history closes, we find a widely scattered population in Virginia settled on large estates, with little concentration in cities; and what was true of Virginia was true in a large way of Maryland, Georgia, and the Carolinas.

Delayed English Settlement in the North.—Our climate becomes more and more rigorous from Chesapeake Bay northward, and we find that successful settlements by the English were not made as early as on the more

southern parts of the American coast. Several early attempts at settlement proved failures: such were the voyages of the Cabots; such was the attempted colony on the Sagadahoc River, made in the same year that Jamestown was settled. One reason for these and other failures in these parts has been suggested by Professor Channing, who attributes it partly to the fact that the early explorations were made in the summer when the climatic differences between Europe and America were at a minimum, leading the explorers to carry home extremely favorable reports. Colonists coming later had to experience the unforeseen severities of the New England winter, which so disheartened them that they abandoned their new home and returned to England.

Sagadahoc.—The failure of the colony on the Sagadahoc is best described by Grahame, who says: "The winter proved extremely severe, and confined this small remnant[1] to their miserable dwelling and a helpless contemplation of the dreary waste that surrounded it." Several colonists died during this winter. Supplies came in the spring, but with them news that Chief Justice Popham and Sir John Gilbert, the most powerful patrons of this Plymouth Company Colony, had died. "Their resolution was completely subdued by so many misfortunes," continues Grahame, "and unanimously exclaiming against longer continuance in those dismal scenes, they forsook the settlement and returned to their native land, which they filled with the most disheartening accounts of the soil and climate of Northern Virginia" (in what is now a part of Maine).

Why the Pilgrims landed at Plymouth.—The first permanent English settlement north of Maryland was made by the Pilgrims at Plymouth, Mass., in 1620. Religious conditions in England had inspired these people with the purpose of going to America, where they could believe as they wished; meteorological factors determined the planting of the colony on the shores of Massachusetts Bay. Sailing from Plymouth, England, the Pilgrims intended to found their new home near the mouth of the Hudson River. For sixty-three days their little craft was buffeted about by the winds and waves, and the storms so far carried them from their course that the first land sighted was Cape Cod. Even then perhaps, their original purpose might have been effected had not a "contrary wind" driven them back in their further effort to reach the Hudson.

Delayed by accidents when they first sailed from England, and turned from their original destination, these Pilgrims landed at a time and place when the elements of the climate were decidedly against them. The first winter may have been unusually mild, since some of the settlers appear to

[1] All but 45 of the original 100 had already returned to England because of the barrenness of the region.

have written that it was "as severe as that of England." But whether that first winter on the shores of Massachusetts Bay was unusually mild or not, it was certainly too severe for the sturdy band who were unprepared for its severities, and "if an early spring had not brought relief, the colony must have perished to a man" for already the winter had swept off half the population of the infant colony. But "out of the snows of winter, the desolation of disease, and the terrors of death, the faith of the Puritan had come forth triumphant."

Here it may be in order to note that the maintenance and development of a strong colony on this northern shore was possible chiefly because of the character of the colonists who settled there. Had the easy-going colonists of Virginia settled on the shores of Massachusetts Bay, the history of that settlement might have simulated that of the colony on the Sagadahoc River. On the other hand, what would have been the history of Virginia, and what the character of their descendents had the Pilgrims and Puritans landed on the shores of the James or the Rappahannock?

John Smith's Attempt.—Before the *Mayflower* sailed for America John Smith had planned a colony in New England, but his plans were overthrown. The third and last time that he tried to carry out his designs, meteorological factors intervened, for the steady blowing of westerly winds kept him at Plymouth, England, for three months, when he finally abandoned his project. The delay probably gave New England a history far different from what it might have had had John Smith been the one to plant the first colony on its shores.—*From the Monthly Weather Review,* Volume XXXVI, No. 6, June, 1908.

The Climate of the Canadian Yukon.—People are always interested in the climate and continually ask "What is your weather?" We have no idea of the beautiful summers of the Yukon; we imagine that Dawson is a cold, barren place, and that even in the middle of summer snow is seen on every hand. Such notions are indeed far from the actual facts. The months of May, June, July, August, and part of September are regular paradises and are the finest we meet in any part of Canada. The visitor who expects to need heavy clothing is agreeably surprised; the sun shines for a large part of the twenty-four hours; indeed, at latitude 64° 40′ there is continuous daylight during the months of June and July. To the pole more heat comes from the sun during the 21st of June than comes to any other point on the earth's surface during any day of the year. Then, the sun giving out his heat and light makes it a desirable resort for the summer months. It is true that ice is found only a short distance below the surface of the ground, yet the traveler is perfectly ignorant of such a circumstance

unless it be pointed out to him. The thermometer often registers 85° F. during the day and the evenings are clear and cool for sleeping. Vegetation is very rapid; the abundance of sunlight hurries things along; the heat from above combined with the moisture from below causes rapid growth; and consequently Dawson can boast of the finest vegetables in the world. Her lettuce, celery, beets, carrots, cabbages, and cauliflowers are unexcelled. As we go along the streets most brilliant flower gardens meet us on every hand, and if we forget ourselves a moment we would think we were in some tropical land. But the refreshing breeze from the mountain far away recalls us to ourselves.—*From the Monthly Weather Review,* Volume XXXVI, No. 6, June, 1908.

Products of Guatemala.—Guatemala is the most populous, and in many respects the richest and most highly developed, of the Central American countries. It has an area of about 48,300 square miles, just about that of New York. No state or country of anything like similar area is by nature richer or more promising. It has vast areas of fertile agricultural land, a splendid climate, great forest and mineral wealth, and is rich in scenic and historical attractions. Nearly all the products of both the temperate and tropic zones grow to advantage. Wheat, corn, barley and hemp flourish. Coffee of a superior quality and sugar cane are great staple crops. Fine cotton is raised, and the country seems ideal for stock. Over one hundred fruits and vegetables are grown, including all the common ones of our country and many tropical edibles we do not know. The banana is the principal fruit cultivated, and with coffee, mahogany and rubber, makes up the principal exports of the country. Only a small portion of the available area has been developed agriculturally. Little has been done with the forests and the mineral resources. From the mountain streams can be developed a large amount of power, and a wide range of industries should be successfully established, where at present there are scarcely any outside of the sugar factories, a single cotton mill, a few small tanneries, and the salt works at San José. Guatemala now has a transcontinental railway line running from Puerto Barrios on the Atlantic side to San José, by way of New Guatemala, on the Pacific coast, a distance of about 270 miles.—*From Review of Reviews* for August.

Wheat Fields and Markets of the World.—Taking the record in 1906 with a world product of 3,423,700,000 bushels of wheat, the leading wheat producing countries were: United States, 735,261,000 bushels; Russia, 450,000,000; France, 324,725,000; British India, 319,582,000; Austria-Hungary, 268,574,000; Italy, 168,000,000; Spain, 154,090,000; the Argentine Republic, 134,931,000, and Canada, 131,614,000.—*From*

Bulletin of the International Bureau of The American Republics, September, 1908.

CACAO.—Cacao is the correct word to apply to a product which ranks with coffee and tea as a great and instinctively selected stimulus in the dietary of man. By using this term cacao instead of the English one of cocoa, two advantages are gained: First, the word then becomes of universal application, for cacao is the commercial and domestic term applied throughout Latin-America, it has been adopted in Europe since the days of the earliest importation from the New World, it is the naturalized expression wherever it is adopted in the East Indies, and will be understood even in Japan, although it offers no rivalry there to the national and native tea; second, a confusion, unfortunately so prevalent throughout the English-speaking world, will be avoided. Cocoa is apt to be confounded with coca, the plant of Peru which the Indians use to sustain them in their weary journeys across the mountains, and which furnishes the drug (alkaloid) called cocaine in medicine; as a matter of fact cocaine and cocao are botanically quite different, and have nothing in common, a point that should be well known, because the fear that cocaine forms part of cocoa is entirely groundless. Cocoa is supposed also to be of the same family as the cocoanut, but here, too, the resemblance goes no further than the name, for the cocoanut is a palm and requires an altogether different soil for its propagation.

Cacao is essentially a tropical cultivation, and is known in countries situated both north and south of the line. On the north side of the equator the cacao countries are Ceylon, the Philippines, Cameroon, the Gold Coast, Mexico, Nicaragua, the Guianas, Salvador, Guatemala, Venezuela, and the West India Islands; south of the equator the main cacao countries are Ecuador, Brazil, Peru, and parts of Africa with the adjacent islands. The extreme range of latitude is from 20° north to 20° south. Not only is the cultivation of cacao limited to these few degrees within the Tropics, but it is usually a success only in those areas in which the altitude is very insignificant; an elevation of between 650 and 2,600 feet marks the limits of the successful cocao plantations in this equatorial belt. In this respect it presents wide differences when compared with tea, cinchona, camphor and coffee, and certain similarity in environment to the cocoanut palm, to the rubber plant, and bananas.—*From Bulletin of the International Bureau of The American Republics,* September, 1908.

PANAMA HATS.—The expression "panama hat," as indicative of the origin of this celebrated article of headgear, is an evident misnomer, inasmuch as these hats are made in the greatest perfection in Ecuador, Peru,

and Colombia. Formerly the entire output of this product, destined for the foreign trade, was shipped via the principal port of the Isthmus of Panama, which became the great mart and intermediate depository of this important article of South American commerce, and in the course of time these famous and much-sought-for hats were inappropriately designated, in the markets of the world, "Panama hats." For many years Panama enjoyed the enviable distinction of being the chief market for the sale and distribution of these hats, but Guayaquil, Ecuador, long ago wrested that honor from the isthmian city and remains to-day the great emporium and distributing center of the Panama hat industry of the world. In Latin America these hats are not now, nor have they ever been, known as "Panama" hats, but are universally called "Jipijapa," in honor of the town in Ecuador where it is said they were first manufactured.—*From Bulletin of the International Bureau of The American Republics,* September, 1908.

THE LARGEST CITY IN THE SOUTHERN HEMISPHERE.—At the close of the year 1907 the population of the city of Buenos Aires numbered 1,129,286, as compared with 1,084,113 in December of the preceding year, an increase of 4.9 per cent. being shown for the twelve months. The birth rate was 34.6 per thousand and the death rate 16.4 per thousand, the former one of the highest and the latter among the lowest in the vital statistics of the world.—*From Bulletin of the International Bureau of The American Republics,* September, 1908.

STANDARD TIME IN PERU.—On July 28, 1908, the Republic of Peru adopted Standard Time and hereafter the time in use will be the same as that at Washington, D. C.—namely, 75th meridian time.

THE STUDY OF THE WEATHER IN PUBLIC SCHOOLS.—A ten-page article entitled *The Weather Bureau and the Public Schools* and appearing in the Year Book of the Department of Agriculture for 1907, presents some interesting facts in reference to the systematic study of the weather in the schools of the United States. About 4,000 schools are regularly supplied with the daily weather map and in many schools teachers act as co-operative observers.

WHAT THE PUPIL SHOULD LEARN BEFORE STUDYING LATITUDE AND LONGITUDE.—Before the pupil is required to learn the latitude of a single place, he should know:

1. That latitude is the angular distance from the equator.
2. That a degree of latitude is about 70 miles.
3. That the higher the latitude the less heat a given area receives from the sun.

4. That the higher the latitude the longer the winter season and the shorter the summer season.

5. That the higher the latitude the less the altitude of the noonday sun.

6. That the higher the latitude the longer the summer day and shorter the winter day.

7. That the higher the latitude the shorter the growing season but the longer the growing day.

8. That countries having corresponding latitudes have in general corresponding seasons.

9. That of the above eight points only 4 and 7 can be modified.

After these general facts of latitude have been thoroughly mastered and the pupil comes to the specific fact that the latitude of Germany is 47 degrees—55 degrees north, it is very easy for the teacher to lead him to see that Germany is 8 degrees or 560 miles from north to south, or about twice as long as the state of Wisconsin; that southern Germany is 4 degrees or 280 miles farther north than Milwaukee; that central Germany is in the same latitude as the northern shores of Lake Superior; that a square mile in Germany receives less heat from the sun than a square mile in Wisconsin; that if latitude were the only factor both the summers and winters would be colder than in Wisconsin; that the winter days are shorter and the summer days longer than in Wisconsin; that if latitude were the only factor the growing season would be very short; that the growing day is very long; that the noonday sun is always 7 degrees higher in central Wisconsin than it is in central Germany.

Before taking up the longitude of any particular place, the pupil should know that:

1. Longitude is the angular distance from the prime meridian.

2. Degrees of longitude vary in length from approximately 70 miles at the equator to 0 miles at the poles.

3. A difference of 15 degrees in longitude corresponds to a difference of one hour in time.

4. All places west of a given meridian have earlier time, all places east, later time.

5. Having the difference in longitude to find the difference in time, divide the difference in longitude by 15 for the hours and multiply the remainder by 4 for the minutes.

6. Locating two places with reference to a known point, they may then be located with reference to each other.—*From School Century,* September, 1908.

WOODS GIVEN SIXTEEN YEARS' ADDITIONAL SERVICE BY PRESERVATIVE TREATMENT

Fence posts of many kinds of cheap woods which ordinarily would soon decay if set in the ground can be made to last for twenty years by a simple treatment with creosote. Most of the so-called "inferior" woods are well adapted to the treatment, and this is especially true of cottonwood, aspen, willow, sycamore, low-grade pines, and some of the gums. When properly treated, these woods outlast untreated cedar and oak, which are becoming too scarce and too much in demand for other uses to allow of their meeting the demand for fence posts.

Impregnation with creosote has been greatly cheapened by the introduction of the "open tank," which can be installed at a cost of from $30 to $45, or much less if an old boiler is used. A tank with a bottom twelve square feet in area will suffice for treating forty or fifty six-inch posts a day, or double this number when two runs per day can be made. The absorption of creosote per post is about as follows: Eucalyptus, one-tenth gallon; willow, two-tenths gallon; sassafras, ash, hickory, red oak, water oak, elm, and maple, four-tenths gallon; Douglas fir, quaking aspen, and black walnut, six-tenths gallon; sycamore, cottonwood, and lodgepole pine, seven-tenths gallon. The price of creosote is about ten cents per gallon in the East and Middle West, sixteen cents per gallon on the Pacific Coast, and twenty-seven cents per gallon in the Rocky Mountain states. The cost of treating a post will therefore vary from four to fifteen cents. Properly treated, it should give service for at least twenty years.

Experiments of the Forest Service show that with preservative treatment the durability of lodgepole pine in Idaho is increased sixteen years. The cost of creosote is there relatively high, yet by treating posts there is a saving, with interest at six per cent., of two cents per post yearly. More important than the saving, however, is the fact that through preservative treatment other woods are fitted to take the place of cedar, of which the supply is rapidly becoming exhausted. A detailed description of experiments in preserving fence posts, together with practical suggestions for treating them on a commercial scale, are contained in Circular 117 of the Forest Service. This publication can be obtained upon application to the Forester at Washington.